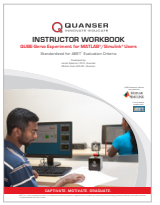
QUANSER
INNOVATE · EDUCATE

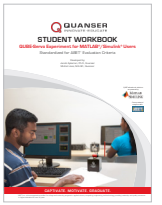
Quick Start Guide: QUBE-Servo Direct I/O Interface

MATLAB SIMULINK

STEP 1 Check Components and Details

Make sure your QUBE-Servo experiment includes the following components:





1. Quanser QUBE-Servo Direct I/O Inferface
2. Inertia disc module
3. Pendulum module
4. Power cable
5. RCA to RCA cable
6. Set of two 5-pin DIN to 5-pin DIN encoder cables
7. 15V 2.0 A power supply
8. Instructor Workbook*
9. Student Workbook*
10. User Manual*

*Provided in digital form on the Workstation Resources DVD and online at www.quanser.com/courseware

STEP 2 Additional Components Required for Set Up

To complete the Quanser QUBE-Servo Direct I/O Interface set up, you will also need the following:

1. QUARC Real-Time Rapid Control Prototyping Software Installation DVD*
2. Quanser Workstations Resources DVD (includes controllers, User Manual, Quick Start Guide, courseware and other files)
3. One of the following data acquisition devices*:
   a. Quanser Q2-USB, or
   b. Quanser Q8-USB, or
   c. NI PCI/PCIe with NI M and X Series Terminal Board

* These components must be purchased separately.

STEP 3 Install and Test QUARC

A. Make sure you have all required software, as listed in the QUARC Compatibility Table document located in the QUARC DVD folder.

B. See the QUARC Installation Manual for details on how to install the software.

C. Make sure you test the system using the Sine and Scope demo. You can access this by typing **qc_show_demos** in the Matlab prompt.

STEP 4 Set Up the Hardware

To set up your QUBE-Servo Direct I/O Interface, please read the following instructions carefully. The connections shown below are illustrated using a generic data acquisition (DAQ) device (you may have a different DAQ). For detailed instructions, see the QUBE-Servo User Manual (enclosed with shipment).

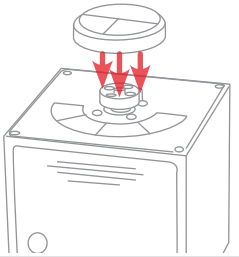
A

Before proceeding, set up and test your DAQ device (e.g., Q2-USB). For detailed instructions, see the Quick Start Guide or User Manual supplied with your DAQ device.

B

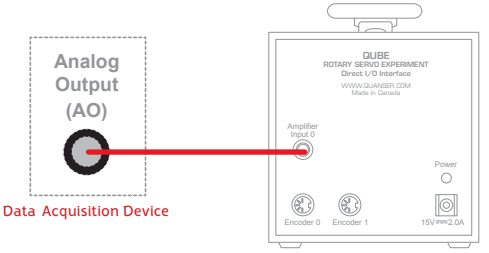
Place the QUBE-Servo on a flat surface with enough space so that the modules will not be obstructed.

C



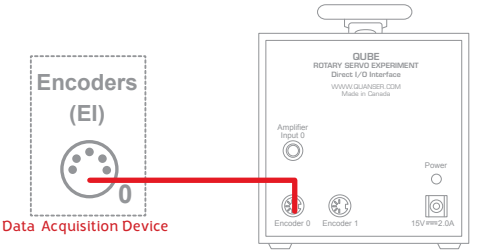
Connect the inertia disc module to the QUBE-servo base by aligning the inertia disc magnets with the magnets on the QUBE-Servo module connector. The module should snap into place.

D



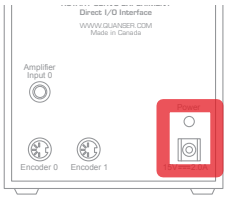
Using the RCA to RCA cable, connect **Analog Output Channel** #0 (AO #0) on the data acquisition (DAQ) device to the **Amplifier Input 0** socket on the QUBE-Servo.

E



Using the 5-pin DIN to 5-pin DIN encoder cable, connect the **Encoder 0** socket on the QUBE-Servo panel to the **Encoder Input** #0 socket on the data acquisition device.

F



Connect the power connector on the QUBE-Servo to the supplied 15V power supply.

G

Connect the power supply to a wall outlet using the appropriate power cable.

H

The green *Power* LED on the QUBE should turn ON.

STEP 5 Testing the QUBE-Servo

Follow the procedure below to test your QUBE-Servo experiment.

A

Make sure your PC is powered ON.

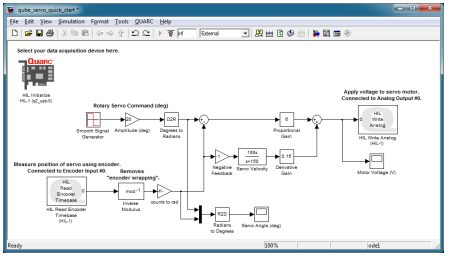
B

On the Resources DVD (supplied with the QUARC package), locate the **Quick Start** folder: Rotary\QUBE-Servo\Quick Start. Copy the **Quick Start** folder to your local hard drive.

Note: Browse online for the latest QUBE-Servo resources at www. quanser.com/courseware

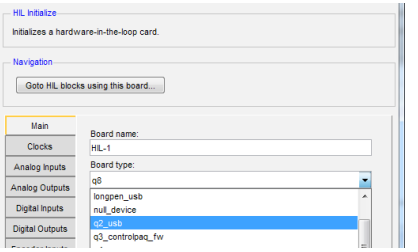
C

Open the Simulink model file (.mdl) found under the **Quick Start** folder on your hard drive.



D

Double-click on the HIL Initialize block and choose the board that is installed on your system (e.g. Q2-USB).

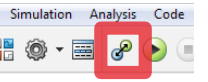


E

Click on the **Build Model** button on the Simulink model toolbar.

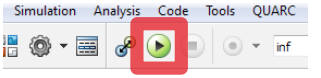
F

Once the model code has been compiled, click on the **Connect To Target** button.



G

Click on the **Run** button to start the QUARC real-time model.



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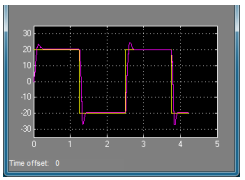
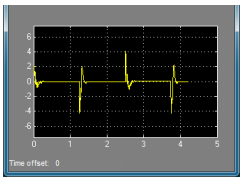


Servo Angle (deg)



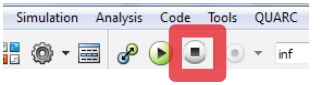
Motor Voltage (V)

The scopes should look similar to those shown here.

The measured servo angle (in purple) should be tracking the desired angle (in yellow) in the **Servo Angle (deg)** scope. The motor voltage is displayed in the **Motor Voltage (V)** scope. If not, consult the Troubleshooting section at the end of this guide.

I

Click on the Simulink **Stop** button to stop the running model



TROUBLESHOOTING

Review the following recommendations before contacting Quanser's technical support engineers.

1. Check the connections outlined in Step 4 of this guide.
2. Make sure cables are firmly connected.

Getting an error when trying to build or run the Quick Start Simulink model (.mdl)

A. Type ver in the *Matlab Command Window* and verify that QUARC is on the list. If not, then go through the QUARC Quick Installation Guide to install QUARC. If it is listed, run *mex -setup* as described in the the QUARC Installation Guide.

You get an 'An operating system specific kernel-level driver for the specified card could not be found' message.

A. Make sure your Data Acquisition (DAQ) device has been properly connected to (or installed on) your PC/laptop. Note that some DAQ devices need to be powered externally, e.g., Quanser Q8-USB.

B. Ensure you selected the correct board type in the HIL Initialize block, as outlined in Steps 5D.

C. Verify that your Data Acquisition device shows up in Device Manager (e.g., when using the Quanser Q2-USB DAQ, the Q2-USB A and Q2-USB B should appear under the *Universal Serial Bus controllers*).

D. Refer to the User Manual or Quick Start Guide that is supplied with your Data Acquisition (DAQ) device for more specific troubleshooting information and testing procedures.

The Motor is not responding.

A. Ensure the green *Power* LED on the QUBE-Servo is lit. If not, make sure the power supply is operational and properly connected.

B. Verify that the data acquisition (DAQ) device used to connect to the QUBE-Servo is functional. Refer to the Data Acqusition (DAQ) Device User Manual or Quick Start Guide for specific troubleshooting guidelines and testing procedures.

STILL NEED HELP?

For further assistance from a Quanser engineer, contact us at tech@quanser.com or call +1-905-940-3575.

LEARN MORE

To browse and download the latest QUBE-Servo resources, visit www.quanser.com/courseware

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